

Remarks

Applicant and their undersigned attorney have carefully considered the Office Action of February 8, 2007 in the above-identified case. In response, Applicant has cancelled the lone independent claim and submits herewith a new independent claim. Applicant also attaches the Declaration of William J. Colucci in support of the patentability of the subject application. Reconsideration of the currently amended claims is respectfully requested.

The claims, as amended, are directed to a method of operating a direct injection gasoline (DIG) engine with a novel fuel composition. Applicant maintains, as supported by the attached Declaration, that a fuel composition including the claimed ratio of a Mannich base detergent and a succinimide compound provides a significant and unexpected performance benefit in DIG engines.

It cannot be assumed that additives used to reduce intake valve deposits (IVDs) will be effective in DIG engines. The reduction of IVDs is important in conventional motors whereas injector fouling and injector deposits are important in DIG engines. To one of skill in the art, there is no reason to expect that an IVD-reducing additive will necessarily have a positive effect in a DIG engine. First, the structure of a DIG engine is significantly different than a conventional combustion engine. Also, IVDs are formed and respond to detergents in a different manner than injector deposits in a DIG engine. An additive to reduce an IVD may not work at all to reduce injector fouling. No conclusions can be drawn between the performance of an IVD-reducing additive in a conventional motor and that additive in a DIG engine.

Data in the application, as highlighted in the attached Declaration, supports Applicant's position. With reference to Table 4 of the subject application, it is clearly illustrated that a cresol Mannich detergent, which is an otherwise effective IVD-reducing additive, in a fuel composition used to operate a DIG engine (see fuel sample 1E) only marginally improves flow loss for an injector in a DIG engine relative to operating the DIG engine with a spark ignition fuel without any detergent at all (see fuel sample 1D). In addition, data in Table 4 indicates that use of a succinimide compound alone (see fuel sample 1F) marginally reduces flow loss relative to no detergent in the fuel at all. However, increasing the treat rate of the sole succinimide compound in the fuel (see fuel sample 1G) reduces flow loss relative to the succinimide alone at a lower treat rate. Finally, a combination of the two compounds used in a near 1:1 ratio (see fuel sample 5) produces flow loss rates that are not significantly better than using either compound alone.

Given that a higher treat rate of a succinimide compound alone produces reduced flow loss, it is entirely counter-intuitive to surmise that a fuel composition with a Mannich detergent and only a trace amount of succinimide (relative to the Mannich detergent) would produce exceptional flow loss characteristics. However, fuel sample 2 of Table 4 illustrates that this combination, in fact, produces only minimal fuel flow loss. The subject application claims a 16:1 up to 1000:1 Mannich to succinimide ratio.

It is only Applicant's extensive testing and research, as published via the subject application, that teaches this counter-intuitive and unexpected result. The combination was clearly not inevitable in Applicant's industry. No other product or reference teaches or suggests the claimed invention.

Applicant has amended the specification to correct a typographical error in Table 4. The attached Declaration confirms the data gathered in the preparation of Table 4 of the application.

Turning then to the specific details of the Office Action, claim 1 and its dependent claims are rejected under 35 USC § 112 first paragraph. It is alleged that the specification does not support the claimed ratio of detergent to succinimide. Applicant points to page 6, line 8-20 of the application as filed. Fuel sample 2 in Table 4 is one example that falls within the claimed ratio. Accordingly, the 112 rejection is traversed.

Claims 1, 3, 7, 10-14, and 17-20 were rejected under 35 U.S.C. 103(a) in light of MacDuff (U.S. Pat. No. 6,458,175). Claims 1, 3, 8-14 and 20 were rejected under the same statute in light of WO 01/42399, which has two inventors in common with the subject application. The Office Action acknowledges that the cited references do not teach the claimed ratio of additive components. However, this lack of a teaching or suggestion is said to be a mere optimization of results based on routine experimentation. Authority for the rejection is cited to *in re Boesch*, *In re Woodruff*, and *In re Aller* (page 6 of the subject Office Action).

As noted above and supported by the data, it is clear that IVD reduction as taught by Macduff is not related to the present invention. IVD-reducing additives do not necessarily operate in a DIG engine and one of skill in the art would have no expectation that an IVD-reducing additive would work as needed in a DIG engine.

Also, applicant maintains that it is incorrect to state, as found in the Office Action, that Macduff teaches a fuel composition "used in the same environment as the fuel composition of the present invention." Conventional and DIG engines are structurally

and operationally different. Deposits formed in these engines are not equivalent. As the Declaration further supports, a skilled artisan having Macduff before them would not recognize that the composition may be used to remove injector deposits.

The particular parameters of the claimed invention “were not recognized as a result-effective variable, i.e., a variable which achieves a recognized result”. MPEP 2144.05 II.B. Basically, it was not at that time recognized that an unbalanced ratio between a succinimide and a Mannich detergent would produce excellent injector fouling results in a DIG engine. Therefore, it is improper to characterize the determination of the subject ratio as routine experimentation.

As the data and Declaration also support, the claimed ratio or concentration of components is critical to the claimed method. “The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims.” MPEP 2144.05 III. In *In re Waymouth*, the court held that an unexpected result for a claimed range, relative to a disclosed range in the prior art, has been established by a demonstration of a marked improvement over the results achieved under other ratios. See 499 F.2d 1273, 1276. The data illustrates that increased succinimide treat rates, when added to a fuel alone, reduced fuel flow loss. It is per se unexpected that trace amounts of succinimide would be effective.

In summary, neither reference teaches or suggests the claimed, critical ratio range of the subject application as solely taught and claimed in the subject application. Macduff does not teach or suggest a fuel composition for use in a DIG engine. Applicant has properly rebutted any prima facie case of obviousness in accordance with the guidelines of MPEP 2144.05. Only Applicant's teaching recognizes the critical ratio.

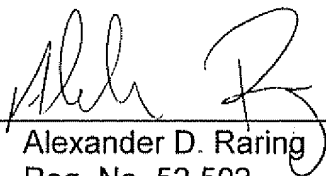
It was not recognized that reducing a succinimide relative to a Mannich detergent improved DIG engine performance.

For at least one of the reasons set forth above, reconsideration of the rejections is respectfully requested. In order to ensure full consideration of the foregoing amendments and attached Declaration, Applicant attaches herewith a Request for Continuing Examination. After consideration, if necessary, Applicant respectfully requests a telephone conference to expedite further prosecution of the subject application.

No fees are thought to be associated with this filing. Applicant attaches a Request for Continuing Examination with the requisite fee. The commissioner is hereby authorized to charge any deficiencies in fees or credit any overpayment associated with this communication to Deposit Account No. 50-2127.

Respectfully submitted,

Dated: May 8, 2007

By: 
Alexander D. Raring
Reg. No. 52,502
Attorney for Applicant.

John H. Thomas, P.C.
536 Granite Avenue
Richmond, Virginia 23226
(804) 344-8130